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# Tree Removal Permit Package Oak Knoll Mixed Use Development Project

OAKLAND, ALAMEDA COUNTY, CALIFORNIA

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**Date:**

January 2017





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## Memorandum

**To:** City of Oakland  
c/o Robert Zhan, Tree Supervisor II  
Giacomo Damonte, Arborist Inspector

**From:** Kari Dupler  
dupler@wra-ca.com

**Subject:** Oak Knoll Mixed Use Development Project Tree Removal Impact Mitigation Plan

**Date:** March 24, 2017

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### Introduction

The purpose of this memorandum is to describe the proposed tree mitigation plan that has been developed to compensate for tree removal impacts associated with the proposed Oak Knoll Mixed Use Development Project (Project) in Oakland, Alameda County, California (Project Area). Oak Knoll is a Master Planned Residential Community Development Project that would develop up to 935 residential units, including a range of single-family housing types, townhomes, and multifamily units that would be developed throughout the Project Area. A Village Center would provide a variety of neighborhood-serving retail of approximately 72,000 square feet of locally serving commercial uses and the highest density housing. The Project would also create approximately 75 to 85 acres of publicly accessible open space comprising an extensive network of parks, trails, and walkways that would weave through the Project Area, connecting various neighborhoods within the Project Area with adjacent open space areas and neighborhoods.

The Project would result in the removal of approximately 4,502 trees, most of which are protected under the City of Oakland's (City's) Tree Protection Ordinance. The Project proponent (Applicant) will obtain a tree removal permit from the City prior to the removal of these trees. Additional mitigation measures proposed by the Applicant to compensate for the loss of protected trees and oak woodland are summarized below.

### Tree Impacts

WRA, Inc. (WRA) ISA-Certified Arborists, Erich Schickenberg (#WE-10211A) and Scott Yarger (#WE-9300A), conducted tree surveys throughout the months of April, May, and October 2015, and January 2017 (see WRA 2015a for detailed methodology). The tree surveys included an inventory and basic assessment of all trees within the Project Area and surrounding areas potentially impacted by the Project. All trees greater than 9 inches in diameter at breast height (DBH) were surveyed and all coast live oak (*Quercus agrifolia*) trees greater than 4 inches in DBH were surveyed, in accordance with the City of Oakland Tree Ordinance. Although eucalyptus (*Eucalyptus* spp.) and Monterey pine (*Pinus radiata*) are not protected by the City Ordinance, these species were also surveyed for a more complete analysis. Data relevant to the tree removal permitting process, including species, size (DBH), protection status, and condition rating (ranging

from poor to excellent) were collected. Each surveyed tree location was recoded using a GPS with sub-meter accuracy, and each tree was given a unique, numbered aluminum tree tag.

The survey identified 4,502 trees within the limits of disturbance (LOD) and for invasive removal, of which 3,567 are protected under the City Tree Ordinance, and 2,518 are native species (see Table 1 and Appendix A). For the purpose of this analysis it is assumed that trees located within a 10-foot buffer of the LOD would be preserved; however, a small number of these trees may be impacted depending on the extent of adjacent disturbance as well as the extent of the root zone and canopy. If additional trees are impacted, they will also be mitigated for in accordance with the City Tree Ordinance.

Project impacts are generally concentrated in previously developed, in-fill areas, and disturbed areas. The trees proposed for removal are disproportionately non-native, invasive species. In total, the Project would impact approximately 51% of the native trees within the Project Area and 84% of the non-native trees in the project area. Most of the highest quality habitats within the Project Area including the Hardenstine parcel in the southeast, the knoll in the east, and the Rifle Range Creek corridor would either be preserved or restored as part of the project. The majority of non-native trees being impacted are invasive species such as blue gum (*Eucalyptus globulus*), Monterey pine, and blackwood acacia (*Acacia melanoxylon*) which have colonized portions of the site and have converted native grasslands and oak woodlands to invasive-dominated woodlands. As such, the removal of invasive trees and, in some cases, conversion to native oak woodlands is expected to result in improved habitat quality for native plants and wildlife over time.

Of the native trees proposed for removal, 817 (32%) are less than 9 inches in DBH and 460 (19%) are currently in poor condition, defined as being in moderate to severe decline (see Tables 2 and 3). The remaining native trees are greater than 9 inches in DBH and are in fair to excellent condition.

**Table 1.** Summary of Trees within the Limits of Disturbance, 10-Foot Disturbance Buffer, and Preserved Areas.

Species	Limits of Disturbance	Location			Total
		10-ft buffer	Invasive Removal	Preserved Area	
<b>Native</b>	<b>2,518</b>	<b>149</b>	<b>-</b>	<b>2,280</b>	<b>4,947</b>
<i>Quercus agrifolia</i> <sup>1</sup>	2,298	140	-	2,064	4,502
<i>Umbellularia californica</i> <sup>1</sup>	55	6	-	168	229
<i>Salix laevigata</i> <sup>1</sup>	53	-	-	3	56
<i>Salix lasiolepis</i> <sup>1</sup>	37	2	-	3	42
Other <sup>1</sup>	75	1	-	42	118
<b>Non-native</b>	<b>1,629</b>	<b>73</b>	<b>355</b>	<b>319</b>	<b>2,376</b>
<i>Eucalyptus globulus</i> <sup>2,3</sup>	325	48	172	146	691
<i>Acacia melanoxylon</i> <sup>3</sup>	296	5	18	48	367
<i>Pinus radiata</i> <sup>2</sup>	124	-	100	29	253
<i>Cedrus deodara</i>	159	6	-	5	170
<i>Eucalyptus camaldulensis</i> <sup>2,3</sup>	100	1	37	1	139
<i>Acacia baileyana</i>	55	5	1	4	65
<i>Quercus ilex</i>	55	-	-	15	70
<i>Pinus ponderosa</i>	27	3	2	20	52
<i>Eucalyptus sideroxylon</i>	52	-	-	-	52
<i>Acacia longifolia</i>	25	2	1	15	43
Other (protected)	387	3	23	36	449
Other (non-protected)	24	3	1	-	28
<b>Total</b>	<b>4,147</b>	<b>222</b>	<b>355</b>	<b>2,599</b>	<b>7,323</b>

<sup>1</sup>Require mitigation under the City of Oakland Tree Ordinance.

<sup>2</sup>Not protected under City of Oakland Tree Ordinance.

<sup>3</sup>Listed is invasive by the California Invasive Plant Council.

**Table 2.** Summary of Impacted Native Trees by Size Class

Species	Size Class				Total
	4.0-8.9	9.0-17.9	18.0-35.9	>36.0	
<b>Native</b>					
<i>Quercus agrifolia</i>	817	921	595	185	2,518
<i>Umbellularia californica</i>	-	40	14	1	55
<i>Salix laevigata</i>	-	15	14	1	53
<i>Salix lasiolepis</i>	-	12	16	9	37
<i>Alnus rhombifolia</i>	-	16	7	2	25
<i>Sequoia sempervirens</i>	-	2	7	2	11
<i>Sambucus nigra ssp. caerulea</i>	-	5	4	1	10
<i>Prunus ilicifolia</i>	-	6	4	-	10
<i>Aesculus californica</i>	-	4	5	-	9
<i>Arbutus menziesii</i>	-	1	4	-	5
<i>Platanus racemosa</i>	-	3	1	-	4
<i>Heteromeles arbutifolia</i>	-	1	-	-	1
<b>Total</b>	<b>817</b>	<b>921</b>	<b>595</b>	<b>185</b>	<b>2,518</b>

**Table 3.** Summary of Impacted Native Trees by Condition

Species	Condition Rating				Total
	Poor	Fair	Good	Excellent	
<b>Native</b>					
<i>Quercus agrifolia</i>	387	1,223	638	50	2,298
<i>Umbellularia californica</i>	5	14	33	3	55
<i>Salix laevigata</i>	29	17	6	1	53
<i>Salix lasiolepis</i>	22	13	2	-	37
<i>Alnus rhombifolia</i>	10	12	3	-	25
<i>Sequoia sempervirens</i>	-	4	2	5	11
<i>Sambucus nigra ssp. caerulea</i>	4	4	2	-	10
<i>Prunus ilicifolia</i>	4	3	2	1	10
<i>Aesculus californica</i>	3	5	1	-	9
<i>Arbutus menziesii</i>	1	1	-	3	5
<i>Platanus racemosa</i>	1	1	2	-	4
<i>Heteromeles arbutifolia</i>	1	-	-	-	1
<b>Total</b>	<b>467</b>	<b>1,297</b>	<b>691</b>	<b>63</b>	<b>2,518</b>

## Proposed Mitigation Plan

### *Mitigation Requirements per the City of Oakland Tree Ordinance*

The City of Oakland Tree Protection Ordinance requires replacement plantings to mitigate for the loss of functions provided by protected trees including shade, erosion control, groundwater replenishment, visual screening, and wildlife habitat. Preliminary mitigation criteria have been agreed upon in consultation with the City during a pre-application design conference and subsequent correspondence between the City and the Applicant. Preliminary mitigation criteria are as follows:

1. Mitigation in the form of replacement trees is only required for native, protected trees. Replacement planting is not required for non-native protected trees (*i.e.*, any non-native species 9 inches DBH or greater, excluding eucalyptus species and Monterey pine).
2. Any native replacement tree will count towards mitigation for native protected tree removal.
3. Mitigation credits for replacement trees will be calculated at the following ratios (replacement trees to removed trees), with larger sized replacement trees receiving greater mitigation credit:
  - 5:1 for 5-gallon pot size;
  - 3:1 for 15-gallon pot size;
  - 1:1 for 24-inch box size;
  - 1:1.5 for 36-inch box
  - 1:2 for 48-inch box
  - 1:3 for 60-inch box.

Details of the proposed tree replacement plan are described below.

### *Conceptual Tree Replacement Plan*

The proposed tree replacement/mitigation plan designed by Hart Howerton, Ltd. and WRA, Inc. entails replanting more than 8,500 native trees across more than 40 acres of the Project Area to compensate for the removal of 2,518 protected trees, for a greater than 4:1 overall mitigation ratio. The proposed mitigation planting palette, tree counts, and conceptual plan are shown on the preliminary tree mitigation map (Hart Howerton 2015; Appendix B). Replacement tree species include more than 10 native tree species, all of which are found to occur naturally within the vicinity of the Project Area. As described above, the Project Area contains significant stands of non-native invasive species, particularly blue gum, Monterey pine, and blackwood acacia. In addition to the tree impacts associated with grading, the Project proposes to remove several hundred non-native, invasive, and fire-prone tree species from several preserved areas with the Project Area. These invasive tree removal areas would then be restored and re-planted with native tree species. This restoration would ultimately improve habitat quality for native species and reduce the risk of fire.

The preliminary tree mitigation map (Appendix B) includes four conceptual planting areas: open space/woodland slope areas, street tree planting areas, community center, and in-tract areas. In addition, the mitigation areas would include a proposed riparian planting palette in accordance with the proposed Rifle Range Creek Riparian Restoration Plan (WRA 2015b). Replacement trees sizes will vary from five-gallon pot size up to 60-inch box trees, with most replacement trees

being 15-gallon pot size. Proposed spacing for replacement trees will range from grouped plantings 10 to 14 feet on center per 700 square feet for small 5- to 15-gallon pot sizes, to 23 to 26 feet on center for larger box trees. The final spacing of replacement trees will be determined in consultation with the City Arborist and will be dependent on available space, slope, aspect and soil conditions.

#### *Mature Tree Transplantation*

In addition to planting replacement trees from local nursery stock, the Project proposes to save and transplant mature, healthy, native trees from within the proposed LOD where feasible. The Project Applicant is currently assessing the feasibility of transplanting indigenous coast live oak trees from within the proposed LOD to the proposed mitigation areas. Transplanting mature, healthy coast live oak trees, indigenous to the Project Area, instead of removing and replacing with nursery stock would help to reduce the number of trees impacted by removal and would preserve healthy, locally adapted specimens, that in many cases are larger than any commercially available replacement trees.

Potential candidates for transplantation and preservation within the proposed mitigation area are currently being assessed based on the following criteria:

1. The tree is a native coast live oak within the proposed impact area/LOD.
2. The tree is in moderate to excellent condition, exhibiting no significant defect or health issue.
3. The tree is generally open-grown, and exhibits good form typical of the species. The tree is located on a negligible to mild slope, as trees growing in this topography typically develop stable root systems amenable to transplantation.

Although trees growing within closed canopy environments and on steep slopes may often be healthy and in good condition, these trees are often poor candidates for transplanting, as they are adapted to growing in closed canopy environments and will not fare well when transplanted into a new environment. Following the criteria listed above, it is estimated that up to 20 indigenous coast live oak trees will be potentially transplanted into the proposed mitigation area.

In addition to transplanting potentially impacted native coast live oak trees, the Project Applicant is also assessing the feasibility of transplanting potentially impacted mature, healthy, non-native ornamental trees such as holly oak (*Quercus ilex*), and Deodar cedar (*Cedrus deodara*). As per the Ordinance described above, mitigation is not required for removal of non-native species; however, the Project Applicant is interested in reducing overall tree removal impacts where feasible, and transplanting trees off-site where feasible. Potential candidates for transplantation off-site are currently being assessed based on criteria 2 and 3 outlined above, except that these trees will be desirable non-invasive, ornamental species such as holly oak and Deodar cedar. Non-native, invasive species such as eucalyptus and acacia will not be considered for transplantation. Potential off-site transplantation could include privately-owned land owners purchasing trees for use on private landscapes and/or donation of trees to the City for use on public lands such as City-owned parks.



## **Additional Considerations and Recommendations**

### *Fire Prevention and Defensible Space Requirements*

Fire prevention and defensible space requirements are important considerations in regards to the conceptual tree mitigation/replanting plan. The California Department of Forestry and Fire Protection (CAL FIRE) has identified the Project Area as a Very High Fire Hazard Severity Zone (VHFHSZ) based on data and models of potential fuels and their expected fire behavior (CAL FIRE 2008). Within areas designated as VHFHSZs, California Building Codes require that hazardous vegetation and fuels be managed to reduce the severity of potential for wildfire. Homeowners are required to maintain defensible fuel space, or areas of reduced vegetation intended to reduce the potential for wildfire to spread, within 100 feet of occupied structures.

To comply with defensible fuel space requirements, mitigation areas located within 100 feet of proposed structures would be maintained with a sparse understory and well-pruned, well-spaced trees.

### *Sudden Oak Death Prevention*

Preventing the potential spread of *Phytophthora ramorum*, the pathogen that causes sudden oak death (SOD), is another factor considered in the conceptual tree mitigation/replanting plan. Verified occurrences of SOD occur in the vicinity of the Project Area (Kelly and Tuxen 2003; Kelley et al. 2004). Laboratory testing of plant material is required for confirmation of the pathogen, and although this was not done, the presence of the disease within the Project Area is assumed based on the proximity of the nearest verified occurrence and observations of symptoms of the disease on susceptible species within the Project Area. Coast live oak is one of the primary true oak (*Quercus*) species killed by SOD, and within coast live oak woodland, California bay foliage is the primary vector of the pathogen (Swiecki and Bernhardt 2013). California bay is deliberately omitted from the replanting plant list due its role in spreading SOD. Additional measures recommended to prevent the spread of SOD during tree removal and replanting activities are described below.

Before working:

- Provide crews with sanitations kits. (Sanitation kits should contain the following: Chlorine bleach [10/90 mixture bleach to water], or Clorox Clean-up®, scrub-brush, metal scraper, boot brush, and plastic gloves).
- Ensure that work crews have properly cleaned and sanitized pruning gear, trucks, and chippers prior to entering the Project Area.
- Clean and sanitize shoes, pruning gear and other equipment before working in an area with susceptible species
- Susceptible species present within the Project Area include: coast live oak, canyon live oak, and California bay.

While working:

- When possible, conduct all tree work on *P. ramorum*-infected and susceptible species during the dry season (June - October). The pathogen is most likely to spread during

periods of high rainfall especially in spring (April and May). Working during wet conditions should be avoided.

- If working in wet conditions cannot be avoided, keep equipment on paved or dry surfaces and avoid mud.
- Work in disease-free areas before proceeding to suspected-infestation areas.
- All debris from California bay trees, the primary vector of the pathogen, shall be mulched and spread in place, moved to a sunny dry area free of coast live oak, or disposed of off-site in a permitted disposal facility in accordance with state and federal regulations.
- When removing California bay trees, all mulch and debris shall be segregated from other species when chipping, and all pruning gear and equipment, including chippers and trucks shall be cleaned and sanitized before working on coast live oaks.

After working:

- Use all reasonable methods to clean and sanitize personal gear and crew equipment before leaving a *P. ramorum*-infested site. Scrape, brush and/or hose off accumulated soil and mud from clothing, gloves, boots and shoes. Remove mud and plant debris, especially California bay, by blowing it out or power washing chipper trucks, chippers, buckets trucks, fertilization and soil aeration equipment, cranes, and other vehicles.
- Restrict the movement of soil and leaf litter under California bay trees as spores are most abundant on California bay leaves. Contaminated soil, particularly mud, and plant debris on vehicle tires, workers boots, shovels, chippers, stump grinders, trenchers, etc., may result in pathogen spread if moved to a new, uninfested site. Thoroughly clean all equipment and remove or wash off soil, mud, and plant debris from these items before use at another site. If complete on-site sanitation is not possible, complete the work at a local power wash facility.
- Tools used in tree removal/pruning may become contaminated and should be cleaned thoroughly with a scrub brush and disinfected with Lysol® spray, a 70% or greater solution of alcohol, or a Clorox® solution (1 part Chlorox® to 9 parts water or Clorox Clean-up®).

When planting:

- Replanting should occur in the early fall when the pathogen is less active, and in order to take advantage of seasonal rains. Replanting activities should avoid late winter and spring.
- Planting sites for susceptible species including coast live oak and canyon live oak should be selected in areas that are at least 20 yards away from California bay trees, brush and/or plant material.
- California bay shall not be used as mulch for new plantings.
- Small, non-protected (less than 9 inches diameter) California bay trees and brush should be cleared within a 20-yard or greater buffer where feasible to protect susceptible oak trees that are selected for preservation.

## Conclusions

The Project would remove approximately 2,518 native trees and 1,984 non-native trees from within the Project Area. As mitigation, the Project would plant more than 8,500 native trees across more than 40 acres of the Project Area. In addition, the project would preserve 2,280 native trees and would restore the entire Rifle Range Creek corridor as well as several native oak woodland areas. Overall, the project would result in a net increase in the number of trees and acres of woodland currently present within the Project Area, including a substantial net increase in the number of native trees and native oak woodland areas (Table 4).

**Table 4.** Summary of Proposed Changes in Tree Counts and Woodland Acreages as a Result of the Project

Metric	Existing	Proposed	Approximate Change
Number of Trees	7,323	~10,818	+3,495 (48%)
Native Trees	4,947	~8,500	+1,753 (+72%)
Non-native Trees	2,376	~500	-1,876 (-79%)
Acres of Oak Woodland	28.9	~42.5	+13.6 (+47%)
Acres of Riparian Woodland	7.3	~16.0	+8.7 (+119%)

## References

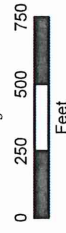
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- WRA, Inc. 2015a. Rifle Range Creek Riparian Restoration Plan. 24 pp.
- WRA, Inc. 2015b. Tree Survey Report for the Oak Knoll Project. 8 pp.

**APPENDIX A. TREE REMOVAL PLAN**

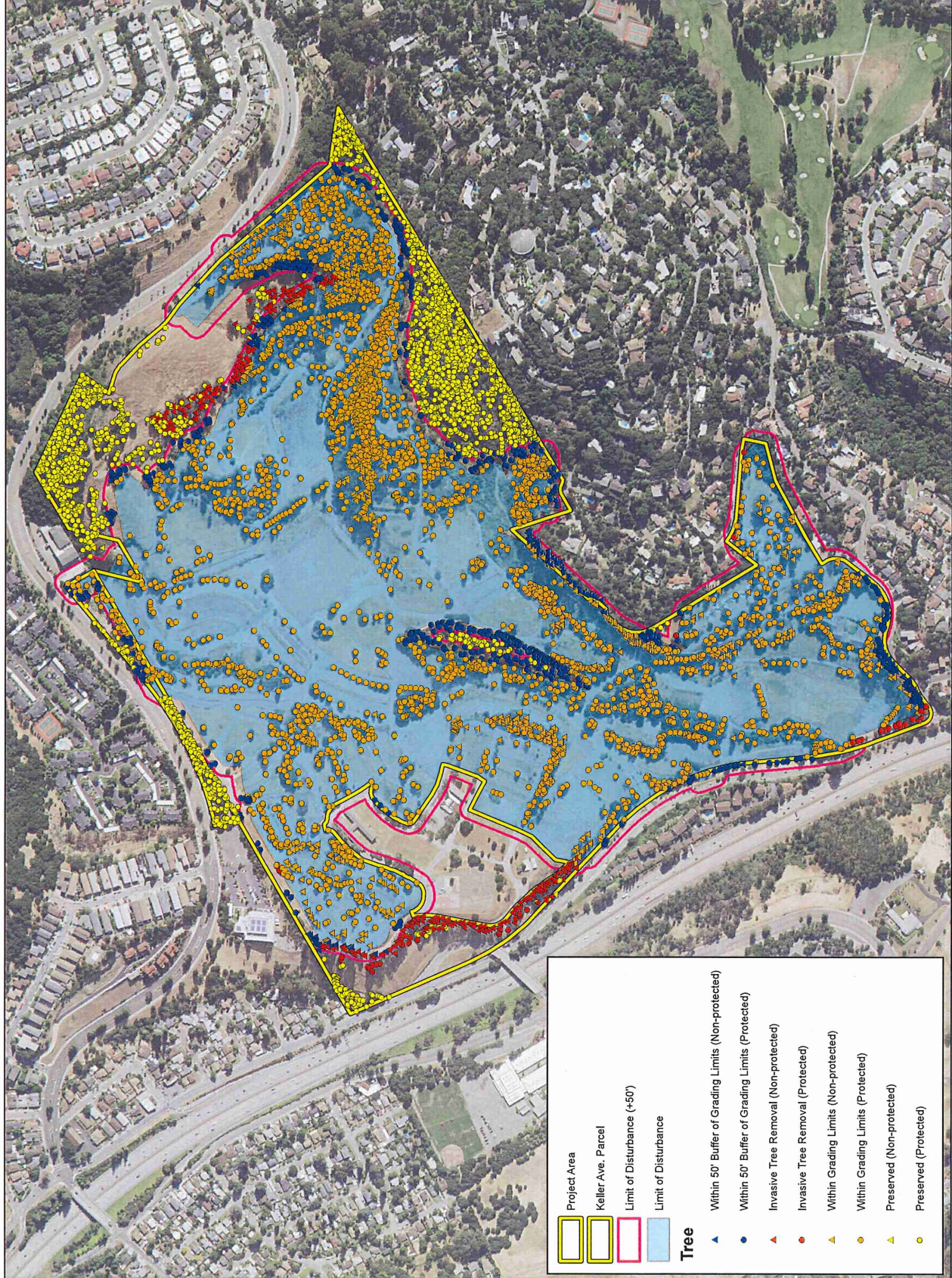


Oak Knoll Mixed Use  
Community  
Development Project  
Alameda County,  
California

Tree Removal Plan



Map Prepared Date: 1/31/2017  
Map Prepared By: czumwalt  
Base Source: USGS EROS  
Data Source(s): WRA

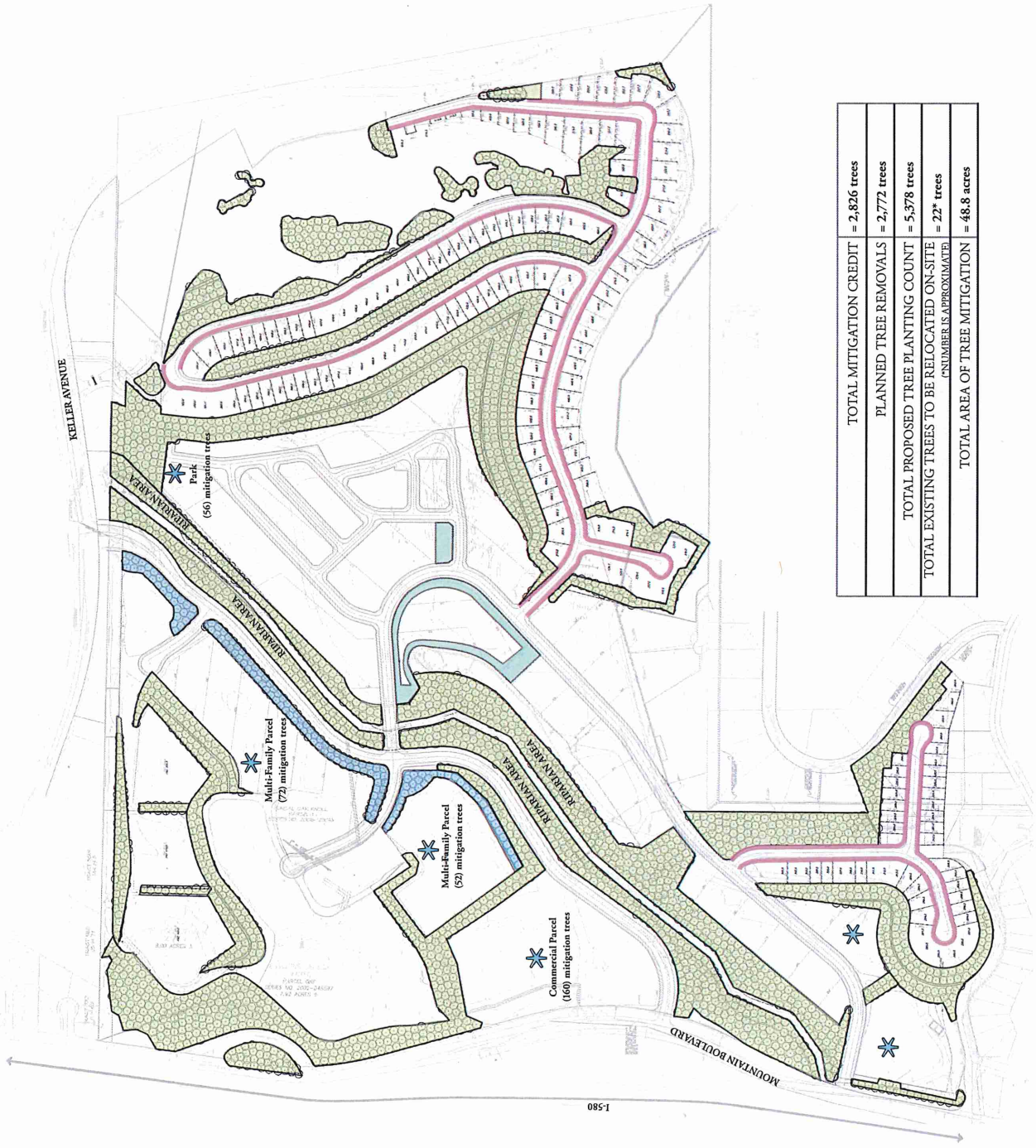


	Project Area
	Keller Ave. Parcel
	Limit of Disturbance (+50')
	Limit of Disturbance
<b>Tree</b>	
	Within 50' Buffer of Grading Limits (Non-protected)
	Within 50' Buffer of Grading Limits (Protected)
	Invasive Tree Removal (Non-protected)
	Invasive Tree Removal (Protected)
	Within Grading Limits (Non-protected)
	Within Grading Limits (Protected)
	Preserved (Non-protected)
	Preserved (Protected)

**APPENDIX B. CONCEPTUAL MITIGATION PLAN**

**DRAFT**

Note: Location of proposed trees shown is approximate and may vary based on site conditions.



TOTAL MITIGATION CREDIT	= 2,826 trees
PLANNED TREE REMOVALS	= 2,772 trees
TOTAL PROPOSED TREE PLANTING COUNT	= 5,378 trees
TOTAL EXISTING TREES TO BE RELOCATED ON-SITE (NUMBER IS APPROXIMATE)	= 22* trees
TOTAL AREA OF TREE MITIGATION	= 48.8 acres

### OAK KNOLL MITIGATION PLANT LIST

Area	Tree Size	Tree Species	Tree Count	Mitigation Credit
	24" box	Quercus agrifolia / Coast Live Oak	(600)	1:1
	15 gal.	Quercus agrifolia / Coast Live Oak	(1500)	3:1
	5 gal.	Quercus agrifolia / Coast Live Oak	(600)	5:1
	15 gal.	Quercus wislizeni / Interior Live Oak	(50)	3:1
	15 gal.	Quercus chrysolepis / Canyon Live Oak	(150)	3:1
Open Space/Woodland Slope Areas/Parks	15 gal.	Heteromeles arbutifolia / Toyon	(800)	3:1
	15 gal.	Aesculus californica / Buckeye	(850)	3:1
	15 gal.	Garrya / Silktassel	(900)	3:1
	5 gal. (or 15 gal.)	Arbutus menziesii / Madrone	(50)	5:1 (3:1)
	5 gal.	Heteromeles arbutifolia / Toyon	(900)	5:1
	5 gal.	Aesculus californica / Buckeye	(800)	5:1
	5 gal.	Garrya / Silktassel	(295)	5:1
	<b>MITIGATION CREDIT 1,792 trees</b>			

Notes: Spacing of trees to be determined with City Arborist. 24" box trees to be spaced 23'-26" o.c., 15 gallon trees to be planted in groups of (3) with varied spacing of 13'-14" o.c. with (3) trees per 700 sq-ft and 5 gallon trees to be planted in groups of (5) with varied spacing of 10'-11" o.c. with (5) trees per 700 sq-ft.

\*Riparian tree species per WPA - proposed palette for Riparian Upper Bank & Buffer area include Coast Live Oak, California Blueberry, and Toyon.

Area	Tree Size	Tree Species	Tree Count	Mitigation Credit
Typical Secondary Street Tree Planting-Level Street Planter	36" box	Quercus agrifolia / Coast Live Oak	350	1:1.5
<b>MITIGATION CREDIT 525 trees</b>				

Notes: Spacing (1) per lot, approximately 40'-60' apart.

Area	Tree Size	Tree Species	Tree Count	Mitigation Credit
Community Center	60" box	Quercus lobata / Valley Oak	(12)	1:3
	60" box	Quercus agrifolia / Coast Live Oak	(23)	1:3
	60" box	Quercus agrifolia / Coast Live Oak	(18)	1:3
<b>MITIGATION CREDIT 159 trees</b>				

Notes: Spacing per plan, minimum 40' apart

Area	Tree Size	Tree Species	Tree Count	Mitigation Credit
In-Tract Areas	48" box	Quercus agrifolia / Coast Live Oak	(95)	1:2
	48" box	Quercus lobata / Valley Oak	(25)	1:2
	24" box	Aesculus californica / Buckeye	(100)	1:1
	48" box	Quercus chrysolepis / Canyon Live Oak	(90)	1:2
	48" box	Acer macrophyllum / Big Leaf Maple	(20)	1:2
<b>MITIGATION CREDIT 350 trees</b>				

